

NanoRetarder®

Set Retarding Chemical Admixture for Concrete

Product Definition

NanoRetarder is a set retarding chemical admixture specially designed for use in situations where setting time of fresh concrete should be intentionally extended for a long time.

Use

NanoRetarder is recommended for use in the applications and purposes below.

- Any type of concreting operation requiring extended setting time of fresh concrete.
- Continuous and large volume concreting operations.
- Mass concrete applications.
- Concreting operations that cold joint formation is undesirable.
- In case of fresh concrete transportation to very long distances.
- Concreting works requiring extended time for placing, vibrating and surface finishing operations.
- Concreting operations requiring re-vibration.
- Operations in hot weather conditions.

Advantages and Properties

- NanoRetarder significantly extends the initial and final setting time of cement. It is suitable for use in all concreting operations where the fresh concrete must be remained in plastic stage for long time.
- Provides easiness in large-volume and continuous concreting operations requiring advanced planning in production, transportation, pumping, placing, vibrating and surface finishing of fresh concrete.
- Reduces cold-joint formation risk in layered mass concrete production.
- Provides advantage in continuous mass concrete production by keeping the first layer concrete still capable of deforming as the upper layers successively placed in a long time.
- Does not affect the ultimate strength of retarded concrete.
- Does not contain chloride or any other substances that may cause corrosion.

Application Details, Suggestions and Warnings

- NanoRetarder should be used by adding to the mixing water. Alternatively, it can be mixed with 1/3 of mixing water and added to the fresh concrete produced with 2/3 of mixing water. In case of addition to fresh mixture as described, additional mixing time of at least 3 minutes at high speed should be applied. NanoRetarder is not added to the dry mixture.
- NanoRetarder can be used together with superplasticizers without set accelerator effect. In case of the combined usage with superplasticizers (without set accelerating effect), the different types of chemical admixtures should not be mixed together and be used separately. First the fresh concrete mixture should be prepared by the superplasticizer and

then NanoRetarder should be added to the fresh mixture. Please contact R&D department of Lyksor for further information.

- NanoRetarder can be used with Portland cement types described in TS EN 197-1. In addition, it can be used in concrete mixtures containing mineral admixtures such as silica fume, fly ash and ground granulated blast furnace slag. However, the required dosage for the best performance should be determined on trial batches.
- As NanoRetarder significantly extends the initial and final setting time of cement, the plastic stage of concrete will be maintained for a long time. Therefore, it should be considered that the hydrostatic pressure will be remained on the surface of molds for a long time.
- It should be noted that the retarded concrete may be more vulnerable to surface defects due to evaporation. Evaporation from the surface of retarded concrete should be reduced or prevented by covering the surface of fresh concrete with wet fabric.



NanoRetarder should not be used together with set accelerators, hardening accelerators and antifreeze agents.

NanoRetarder should not be used in cold weather conditions.

Recommended Dosage

The dosage of NanoRetarder is a function of the ambient temperature during concreting and the desired delay time of setting. In addition, the dosage is affected from the type of cement and mixture properties of concrete. The recommended dosage rate is between 0.2% - 2% of weight of binding material of concrete. Depending on the ambient temperature, retarding performance of NanoRetarder increases as the dosage increases. The usage of 1% NanoRetarder (CEM 42.5 R, 300 kg/m³) extends the setting time around 19 hours, 13 hours and 5 hours at the ambient temperatures of 15 °C, 25 °C and 35 °C, respectively. Similarly, 0.2%, 1.0% and 2.0 % usage of NanoRetarder at 20 °C ambient temperature result in 3 hours, 14 hours and 27 hours delay in setting time, respectively. Therefore it is recommended that the appropriate dosage of NanoRetarder should be determined on laboratories which capable of simulating the expected ambient temperature conditions of site or trial batches prepared on site directly.

The concretes containing overdose NanoRetard may never set. Presence of mineral admixtures such as silica fume, fly ash and ground granulated blast furnace slag may affect the optimum dosage of NanoRetarder for a target performance. The optimum dosage should be determined on trial batches. Please contact R&D department of Lyksor for technical support.

Technical Properties

Color and form	Brown – Liquid
Chemical base	Modified phosphates
Density (kg/l)	1.125 – 1.165 (at +20 °C)
Chloride ion content	Max 0.1% - chloride free acc. to TS EN 934-2
Alkali content	Max 10%
pH	5-9
Conformity	TS EN 934-2 Table 8

Cleaning of Tools

Concreting tools contact with the product can be easily cleaned with water.

Packaging

30 kg drum

1000 kg IBC

Bulk delivery

Storage and Shelf Life

Shelf life of the product is 12 months when stored in its original package and recommended stored conditions. The product should be stored in dry conditions between +5 °C and +35 °C. It should be protected from direct sunlight and frost.

Security and Health

Eye and skin contact should be avoided. In case of contact with skin, wash with clean water. In case of contact with eye, wash with clean water and be medically consulted immediately. For further information please refer to Material Safety Data Sheet (MSDS) of the product.

Legal Liability

The technical recommendations in this product data sheet are based on the results obtained from experimental studies carried out in the R&D laboratories of LYKSOR and may not be applicable to different concrete mixtures. All customers and users are required to determine the appropriate LYKSOR products for their intended use and to test the suitability of LYKSOR product for their application. Contact LYKSOR for the appropriate product selection and usage details. LYKSOR is not responsible for the improper usage of the products.